IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Confirmation Number: 8875
Hwa Yaw TAM et al.	Attorney Docket: P71474US0
Serial No. 10/594,068	Group Art Unit: 2613
Filed: December 26, 2006	Examiner: Tanya T. NGO

For: RAILWAY MONITORING SYSTEM

DECLARATION UNDER 37 C.F.R. § 1.132

I, Kang Kuen LEE, am a citizen of Hong Kong and reside at Hong Kong. I am familiar with the above-referenced U.S. patent application Serial No. 10/594,068 and the references cited by the Examiner including Tubel (U.S. Patent Application Publication No. 2003/0094281 A1) and Varasi et al (U.S. Patent 5,493,390).

1. I have been holding the post of Head of Hangzhou Project at the Hong Kong Mass Transit Railway Corporation (MTR) since March 2010. From December 2007 to February 2010 I was holding the post of Deputy Projects Director in MTR.

2. From 1964 to 1969 I underwent electrical engineering apprenticeship training in Kowloon Canton Railway (KCR). During the same period I completed a Higher Certificate in Electrical Engineering Course in the Hong Kong Technical College. Upon completion of training, I worked for one year as Engineering Assistant in the Design Office of KCR.

3. From 1970 to 1981 I taught electrical engineering courses in the Technical Institutes of Hong Kong Government, starting as Assistant Lecturer and was Senior Lecturer when I returned to work in KCR in 1981. During this period I completed professional examinations of the UK Engineering Council Course in 1974 and became qualified as Chartered Engineer in 1979.

4. From 1981 to 2007 I held the following posts in KCR:-
   a. 1981 to 1983 – Workshops Engineer responsible for taking over of and setting up the maintenance facilities for the new EMU trains.
   b. 1984 to 1990 – Electrical Services Manager responsible for maintenance and improvement projects for electrical installation and equipment in the railway.
   c. 1990 to 1996 – Head of Infrastructure & Building responsible for maintenance and extension/improvement projects for all infrastructure of the railway except rolling stock.
   d. 1997 to 2003 – Director of East Rail responsible for the business, operation and maintenance of East Rail, conveying around 800,000 passengers a day.
   e. 2004 to 2007 – Senior Projects Director responsible for all major railway projects.

5. During my career with KCR I was fully involved with many upgrading projects to improve the performance and capacity of the railway. Some of these are related to the control of the railway network with use of various types of services as an important element.

6. In addition to my technical role over 26 years with KCR and subsequently 2 years with MTR, I undertook part time post graduate research studies at PolyU in M.Sc in Electrical Engineering and Engineering Doctorate and was awarded the degree of Engineering Doctorate in 2006. During my post-graduate studies in PolyU, all my research projects are related to traction power system simulation, EMI and remote sensing.

7. I confirm that I have knowledge, and technical managerial experience in implementation, maintenance and management of railway networks and control systems therefor. I also have knowledge of commercially available equipment for use in such networks and of the advantages and disadvantages thereof. I have further experience and knowledge in the development and improvement of railway signaling, control and management systems.

8. I confirm I have read and understood the declaration by Professor Siu Lau HO. I attest that the details presented therein relating to the development and evolution of railway monitoring systems are accurate, complete and correct. In particular, I confirm that the technical details, commercial details, system limitations, occupational health and safety issues and prevailing technical practices given by Professor HO are correct, and are in keeping with the knowledge, skills and understanding of an experienced and competent railway engineer.

9. In my opinion, railway engineering is of a conservative nature, due to the onerous requirements in respect of primarily safety to passengers and property. For example, design and analysis engineering in relation to railway technology, including rolling stock and failure analysis and investigation must rely on the established protocols and standards for comparative and analytical purposes. Regarding stress and strain analysis of rolling stock, analysis is typically conducted traditionally using classical mechanical engineering theory, and in late years by use of fine-night element analysis (FEA). Stress and strain related data generated by such analysis must be verified by physical models for which comparative data exists. Experimental data in relation to stress and strain is obtained by way of standard procedures utilizing verifiable data obtained from strain gauge technology. Due to the possible consequences of failure in railway applications, it is imperative that an analytical data be obtained by way of industry accepted and established techniques. During my career with KCR, numerous studies and investigations regarding failure, vibration and deformation of rolling stock and railway track were conducted, and experimental data acquired by way of established strain gauge analysis techniques was utilized in conjunction with analytical models. Foreign and local Hong Kong experts in the field of railway stress analysis and investigation have been engaged and worked on KCR projects for nearly 30 years, all of which utilized known, accepted and standardized strain gauge techniques for analysis in conjunction with theoretical (either classic mechanic or FEA) models.

10. Due to the potential severe consequences of failure in a railway network, in particular in relation to railway network monitoring, it requires a very conservative approach to be taken by railway engineers. Implementation of later and improved technologies, for example new models of sensors for detecting the presence of a train, must undergo rigorous testing and the like in order to be considered sufficiently reliable and safe for interfacing within a railway monitoring system. Further, implementation of new aspects of railway systems, no matter how small a change is, requires extensive testing and verification in use and being run in parallel for redundancy and safety considerations, prior to be implemented and relied upon in a railway network. Due to the well known and documented physical and environmental parameters that a railway sensor must be capable of operating within, and operating reliably for extended periods

of time, as well as no faults and deficiencies in railway monitoring technology, requires railway engineers to operate within known design parameters to provide devices and systems suitable to satisfy the onerous safety and reliability requirements. Furthermore, due to the complex installation of railway monitoring system and hardware as well as very large amounts of financial investment, it is important that implementation of any changes or improvements to a railway monitoring system are compatible with existing hardware and software within a railway monitoring network and provide the requisite reliability and integrity requirements. Thus, when providing improvements and upgrades to a railway monitoring system, railway engineers will implement technology for which they believe and satisfies the onerous reliability and safety factors and which can be readily verifiable against existing data and knowledge, due to the extreme consequences of failure of a portion of a railway monitoring system. Thus, in my experience, significant changes within the field are met with skepticism, and railway engineers will work within or close to the known confines of the technology, and undertake significant verification and auditing before even changes or modifications are made to a portion of a railway monitoring system.

11. From my observation, currently the most commonly used means for locating the position of a train in the network is either using i) track circuits or ii) sensors which are either capacitive or inductive in nature. They work upon non contact interaction with the wheels of rolling stock. Although there have been various types of electro-mechanical sensors proposed and used over the years, there has been regular improvements made to the devices which include failsafe features, resistance to environmental conditions (extreme temperature changes, water from flooding, rain, slow, ice) and longevity. The quality and features of these devices, improved manufacturing processes and advances in other peripheral technologies are resulted in constant improvement and evolution of these devices, and there exist numerous well known manufacturers who produce this equipment for the railway industries throughout the world. However, although evolution and improvement is continuous, these two main prevailing types of railway sensors essentially operate by way of non-contact interaction with rolling stock as it passes the sensor, techniques as known in field, and the sensor provides the signal which is routed into the railway monitoring system network for indicating the time at which rolling stock passes a particular sensor location.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

EXECUTED at 15:00 hours this 2nd day of March, 2011.

By

Kang Kuen LEE